

Claims

What is claimed is:

1 ~~1.~~ An optical assembly comprising:

2 a substrate;

3 a light emitting device mounted over a major surface of the substrate and having a face;

4 * at least one channel formed in the substrate near the face of the light emitting device; and

5 at least one photodetector optically coupled to the light emitted from the face, the channel
6 including at least one surface adapted to receive a portion of the face light and reflect it
7 away from the photodetector so that the photodetector receives primarily direct light from
8 the face.

1 2. The assembly according to claim 1 wherein the substrate comprises silicon.

1 3. The assembly according to claim 1 wherein the light emitting device comprises a
2 semiconductor laser.

1 4. The assembly according to claim 1 wherein the channel comprises at least one V-
2 groove formed in the substrate.

1 5. The assembly according to claim 4 wherein the V-groove has a vertex which is
2 essentially parallel to the face.

1 6. The assembly according to claim 5 wherein the V-groove has a sloped wall facing the
2 face which makes an angle within the range 10 to 75 degrees with the face.

1 7. The assembly according to claim 4 wherein the substrate is silicon and the V-groove
2 has surfaces in the <111>crystallographic plane.

1 8. The assembly according to claim 4 wherein the channels comprise at least two V-
2 grooves.

1 9. The assembly according to claim 1 wherein the face is the back face of the device.

1 10. An optical assembly comprising:

2 ✓ a substrate comprising silicon;

3 ✓ a semiconductor laser mounted over a major surface of the substrate and having a back
4 face;

5 at least one V-groove formed in the substrate near the back face of the laser, the groove
6 including surfaces formed in the <111> crystallographic plane of the substrate; and
7 an ~~array~~ ^{array} of photodetectors optically coupled to light from the back face of the laser,
8 at least one of the surfaces of the V-groove adapted to receive a portion of the light from
9 the backface and reflect it away from the photodetectors so that the photodetectors receive only
10 direct light from the back face.

1 11. An optical transmitter comprising an optical assembly, an optical filter optically
2 coupled to the assembly, at least one photodetector optically coupled to the filter, and control
3 circuitry electrically coupled to the photodetector, the assembly comprising:

4 a substrate;
5 a light emitting device mounted over a major surface of the substrate and having a face;
6 at least one channel formed in the substrate near the face of the light emitting device, the
7 photodetector being optically coupled to the light emitted from the face, and the channel
8 including at least one surface adapted to receive a portion of the face light and reflect it away
9 from the photodetector so that the photodetector receives primarily direct light from the face.

1 12. An optical network comprising a transmitter, an optical fiber optically coupled to the
2 transmitter, and a receiver optically coupled to the fiber, the transmitter comprising an optical
3 assembly comprising:

4 a substrate;
5 a light emitting device mounted over a major surface of the substrate and having a face;
6 at least one channel formed in the substrate near the face of the light emitting device; and
7 at least one photodetector optically coupled to the light emitted from the face, the channel
8 including at least one surface adapted to receive a portion of the face light and reflect it away
9 from the photodetector so that the photodetector receives primarily direct light from the back
10 face.

1 13. A method of forming an optical assembly comprising the steps of:
2 mounting a light emitting device having a face over a major surface of a substrate;
3 mounting a photodetector so as to receive light emitted from the face; and
4 forming a channel in the substrate in close proximity to the face, the channel including at
5 least one surface adapted to receive a portion of the light from the face and reflect it away from
6 the photodetector so that the photodetector receives primarily direct light from the face.

1 14. The method according to claim 13 wherein the channel is formed by etching the
2 major surface of the substrate.

1 15. The method according to claim 14 where the etching forms at least one V-groove in
2 the channel.

1 16. the method according to claim 15 wherein the substrate is silicon, and the V-groove
2 has walls in the <111> crystallographic plane of the substrate.

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